

## Keepin' It R.E.A.L.!: Results of a Mother-Adolescent HIV Prevention Program

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### **Abstract:**

**Background:** The concern that adolescents may be placing themselves at risk for contracting HIV has led to widespread public and parental support for HIV prevention programs. Several programs on increasing communication between parents and teenagers have been tested, but the study of the impact of these programs on resulting sexual behavior is lacking.

**Objective:** To test the efficacy of two interventions for mothers and their adolescents in delaying initiation of sexual intercourse for youth who are not sexually active and encouraging the use of condoms among sexually active youth.

**Methods:** Employed were a control group and two treatment groups: one based on social cognitive theory (SCT) and the other a life skills program (LSK) based on problem behavior theory. Assessments were conducted before the intervention (baseline) and at 4, 12, and 24 months after the baseline assessment.

**Results:** Adolescents and their mothers (total N = 582) enrolled in the trial. At baseline, the adolescents ranged in age 11-14 years and were mostly male and African American. The mean age of the mothers was 37.9 years, and most were African American and single. The primary analyses showed no difference among groups in abstinence rates for adolescents. However, adolescents in the LSK group demonstrated an increase in the condom use rate, and those in the SCT and control groups scored higher on human immunodeficiency virus (HIV) knowledge than those in the LSK group. Mothers showed substantial increases over time in comfort talking about sex and self-efficacy. For HIV knowledge, mothers in the SCT group scored significantly higher than those in the LSK and control groups.

**Conclusion:** The results of this study are comparable to previous studies that have included mothers in the HIV education of their adolescents. Although the program did not demonstrate a substantial effect on abstinence rates, increases were observed in condom use among adolescents and in mother's sex-based discussions and comfort in talking about sexual issues.

**Keywords:** adolescents, HIV prevention, sex-based communication

### **Article:**

Most adolescents know that human immunodeficiency virus (HIV) can be transmitted through sexual intercourse and that condoms can decrease the risk of contracting HIV. However, 47% of

high school students have had sexual intercourse and 37% of these students did not use condoms during the latest sexual intercourse (Centers for Disease Control and Prevention, 2004). The concern that adolescents may be placing themselves at risk for contracting HIV has led to widespread public and parental support for HIV prevention programs. Several programs designed for preadolescents and adolescents show considerable promise in reducing risky sexual practices among adolescents (Jemmott & Jemmott, 1994; Jemmott, Jemmott, & Fong, 1998; St. Lawrence, Jefferson, Alleyne, & Brasfield, 1995). A complementary approach to HIV education is to involve parents in teaching their children about HIV and reinforcing prevention messages. An advantage of including parents in HIV prevention programs is that they can structure and individualize teaching according to the child's developmental age and specific circumstances, and their teaching can be done in accordance with their family values.

A variety of programs designed to increase the parent's involvement in sex education, including HIV education, have been tested (Anderson et al., 1999; Blake, Simkin, Ledsky, Perkins, & Calabrese, 2001; Jorgensen, Potts, & Camp, 1993; Kirby, Barth, Leland, & Fetro, 1991; Lefkowitz, Sigman, & Au, 2000; Miller et al., 1993) and many have demonstrated efficacy in enhancing and increasing communication about sex between parents and adolescents. Some investigators have examined the impact of parent-adolescent programs on the adolescent's sexual behavior (Anderson et al., 1999; Miller et al., 1993). For example, Miller et al. (1993) examined the rates of initiation of sexual intercourse of adolescents who with their parents participated in a home-based video sex education curriculum, and Anderson et al. (1999) evaluated an abstinence-based program that was delivered to parents and their 9- to 14-year-old early adolescents. Neither research team, however, found differences between treatment and control groups in self-reports sexual intercourse (Miller et al., 1993) or pregnancies or intentions to have sex (Anderson et al., 1999).

## METHODS

### *Design*

This study was a randomized cluster trial (Murray, 1998) designed to test the efficacy of two HIV prevention interventions for mothers and their 11- to 14-year-old preadolescents (hereafter, adolescents) and adolescents. The study was conducted with the Boys & Girls Clubs of Metro Atlanta (BGCMA), a community-based organization located in an urban area and serving a predominantly African American population. The study employed two treatment groups and a control group with assessments conducted before the intervention (baseline) and at 4, 12, and 24 months after the baseline assessment. Initial sample size calculations were based on a 58% abstinence rate in the comparison group and a projected 75% abstinence rate in the treatment group at the 24-month assessment. On the basis of previous research (DiIorio et al., 2001a), an intraclass correlation (ICC) of .008 for self-reported abstinence was used to adjust the sample size estimate to account for the effect of sampling persons based on clusters (Murray, 1998).

The study was conducted at 11 BGCMA sites that were randomly assigned by computer to the control and two treatment groups. In accordance with the randomized cluster design (Bandura, 1997; Murray, 1998), all participants from each site participated in the condition to which their site was assigned. Three sites were assigned to the life skills program (LSK) and four sites were assigned to the social cognitive-based intervention (social cognitive theory; SCT) and the control conditions. Before initiation of the study, the research was approved by the institutional review

board of the researchers' institution and by the BGCMA. Participants were recruited and data were collected between 1996 and 2001.

To be eligible for the study, adolescents had to be 11-14 years of age, members of the BGCMA, and living with their mothers. Mothers of adolescents who met these criteria were invited to participate along with their adolescents. Mothers and adolescents were required to participate together, and at least one was required to attend the first group session. Female legal guardians were allowed to participate with a youth if they had served in the role of the mother for at least 1 year. Mothers and adolescents who expressed interest were screened for eligibility, and those eligible were invited to participate. Mothers signed informed consent forms for themselves and their child, and each child signed an assent agreement. All mothers were told about the three different programs within Keepin' it R.E.A.L.! (i.e., SCT, LSK, and control) and the research nature of the program. Mothers and their adolescents first completed baseline assessments and then participated in the intervention or control conditions.

### *Interventions*

One intervention was based on SCT, which recognizes that behavior is dependent on a multitude of personal, environmental, and behavioral factors (Bandura, 1997). The adoption of a behavior or a change in behavior can be facilitated by strengthening cognitive, behavioral, and efficacy skills and providing environmental supports specific to the behavior. For the SCT intervention, mothers and their adolescents attended seven sessions over a 14-week period. Each session lasted 2 hr. Mothers and adolescents attended four sessions together and were divided for breakout discussions in three sessions. Together they participated in sessions on HIV transmission, HIV protection, and living with HIV; communication skills; talking about sex; and values. In separate sessions, adolescents discussed positive and negative peer influences; sexual decision making; and consequences of having sexual intercourse at a young age. In their sessions, mothers focused on adolescent development and reproductive health; peer influences; talking about difficult topics with adolescents; and condoms and contraceptives. All sessions began with an introduction that included an overview of the session and a warm-up exercise to build group cohesion. Following the warm-up, the facilitator led a discussion of take-home activities and personal goals set by each participant at the previous session. The sessions were designed to be fun and interactive with a liberal use of games, videos, discussions, role-plays, skits, and demonstrations. Take-home activities were included at the end of each session to augment session content, and each participant set a personal goal to be accomplished by the next session.

The second intervention, LSK, was guided by problem behavior theory, which is based on the idea that problem behaviors co-occur within adolescents and are based on common underlying psychological attributes or predisposition (Akinyela, 1996; Jessor, 1982; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1997; Weissberg, Caplan, & Harwood, 1991). Mothers and adolescents in the LSK intervention met seven times over a 14-week period. Each session lasted 2 hr. Except for portions of the first and last sessions, mothers and adolescents met in separate groups during the sessions. Each session for adolescents began with a stress reduction exercise followed by discussion of a specific type of at-risk behavior (e.g., smoking, alcohol and drug use, violence, and early sexual intercourse). School performance was discussed in Session 6. The sessions were interactive and included games, role-plays, discussions, videos, demonstrations, and crafts. Take-home activities were distributed at the end of each session. To promote

community involvement, participants visited senior centers and participated in a community service activity. To enhance future time perspective and showcase successful role models, participants took an overnight trip to a historically black college or university.

The mothers' LSK intervention sessions were based on the Conscious Parenting Family Circles Parent Support Process (Akinyela, 1996). The program was modified to fit the structure of Keepin' it R.E.A.L.! while retaining the basic nature of the original parenting program. Consistent with problem behavior theory, the program emphasized the expertise and life-learning mothers bring to the group, and the group was viewed as an opportunity to build community through shared experience. The facilitators used a Freirean approach in which the real issues that mothers bring to the group were used as the basis for teaching and discussion (Freire, 1970). For mothers, each session began with a relaxation activity followed by a review of events that occurred since the last session. The topic of the session was then introduced and discussed. Experiences of mothers were then used to explore parenting problems and issues, and each session ended with a moment of reflection. Mothers were also given take-home activities.

In addition to the two interventions, four BGCMA sites served as the control group. To meet the ethical obligations related to HIV education, mothers and adolescents who agreed to participate in the control group attended a 1-hr HIV prevention session, which consisted of a 20-min videotape on HIV transmission and prevention and a discussion of risk and prevention.

A process evaluation plan was implemented to monitor the integrity of the interventions. The plan included structured facilitator training, weekly meetings with facilitators, and written evaluations completed by facilitators at the end of each session. Also, 20% of the sessions (selected at random) were videotaped and evaluated. Participants in all three conditions completed follow-up assessments at 4, 12, and 24 months following their baseline assessment. A more detailed description of the program including theoretical frameworks and intervention components can be found in DiIorio et al. (2000, 2002).

## *Measures*

### **Adolescent Measures**

#### Intimate Sexual Behaviors

Seven items were used to assess adolescent participants' involvement in sexually intimate behaviors other than sexual intercourse. Each item begins with the stem "Have you ever..." The first item in the series is, "Have you ever held hands with a girl (boy)?" The items progress in degree of intimacy beginning with hand-holding and moving to the touching of genitals. Participants respond with either yes or no to each item. Total scores were determined by summing responses to the seven items and range from 0 to 7, with higher scores indicative of participation in more types of intimate sexual behaviors.

#### Sexual Intercourse

The initiation of sexual intercourse by adolescent participants was measured by the item "Have you ever had sexual intercourse?" Participants responding yes were considered to have had vaginal intercourse. Abstinence rates rather than rates of sexual intercourse initiation were used in the analyses.

### Condom Use

Only participants who responded yes to having sexual intercourse were asked questions about condom use. Participants were asked to specify the number of times they had used a condom for the specified time period. In addition to the question about condom use, the participants were asked to specify the number of times they had engaged in sexual intercourse. On the basis of information provided, the rate of condom use (percentage of time a condom was used) was computed for each time period. Three condom-use variables were considered. These variables were based on the percentage of time a condom was used during sexual intercourse in the recent past (30 days), intermediate past (3 months), and long-term past (6-12 months). In addition to these specific questions, participants were asked at each assessment whether or not they had used a condom the last time they had sex.

### Intentions to Have Sex and Use Condoms

At each assessment, participants who indicated that they had never had sexual intercourse were asked to indicate their intentions about initiation of sex by choosing among the following categories: not to have sex until married, not to have sex until older, and not to have sex until ready. Participants who indicated being sexually active were asked to respond to the following items: use a condom every time you have sex, limit the number of sex partners, talk to partner about HIV, and not to have sex anymore until older.

### Sexual Possibility Situations

The sexual possibility situation measure was used to assess involvement in sexual possibility situations (Paikoff, 1995). Two items were used in the present analysis. To measure the frequency of time adolescent participants spent with groups of boys and girls, participants were asked "How many times have you been with a group of kids in private places with no adults around in the past year?" Possible responses range from 1 (never) to 9 (almost every day). To measure time spent with a member of the opposite sex, participants are asked "How many times have you been with a boy/girl in private places with no adults around in the past year?" Responses range from 1 (never) to 9 (almost every day).

### Self-Efficacy for Abstinence

The adolescent participants' confidence in their ability to resist involvement in intimate sexual behaviors and sexual intercourse was assessed using a 12-item scale (DiIorio et al., 2001a). The measure was based on a predetermined definition of self-efficacy (Bandura, 1997). Each item is measured on a 7-point scale from 1 (not sure at all) to 7 (completely sure). Summing responses to each item yields a total score with higher scores corresponding to higher levels of confidence in resisting pressures to engage in sexual behaviors. The correlations of the scale with theoretically relevant variables were significant and in the predicted direction (DiIorio et al., 2001). Cronbach's alpha coefficient for responses from adolescents in this study was .89.

### Outcome Expectations

Adolescent participants' perception of outcomes associated with the choices of engaging or not engaging in sexual intercourse was assessed using a 16-item scale based on SCT (Bandura, 1997). Each item is rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Total scores are computed by reverse coding negatively worded items and summing responses to individual items. Total possible scores range from 16 to 80, with higher scores corresponding to

more positive outcome expectations related to not having sex. The correlations of the scale with theoretically relevant variables were significant and in the predicted direction (DiIorio et al., 2001a). Cronbach's alpha coefficient for the 16 items was .90.

#### Communication About Sex

Mother-adolescent communication about sex was assessed with a 15-item scale (DiIorio, Kelley, & Hockenberry-Eaton, 1999). This scale is composed of a list of specific topics about sex and other adolescent issues to which adolescents respond yes (they talked about) or no (did not talk about) with their mother, father, friends, or people in school. A summary score was computed by counting sex-based items that the adolescent indicated had been discussed specifically with his or her mother. Kuder Richardson's (KR20) coefficient for the adolescents' responses to the 15 sex-based items was .88.

### **Measures for Adolescents and Mothers**

#### Comfort Talking About Sex

Both adolescents and mothers assessed their level of comfort in talking with each other about sexual topics. Each of the six items was rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Individual items were summed to yield a total score. Cronbach's alpha for adolescents' responses was .68 and for mothers, it was .71.

#### HIV Knowledge

Knowledge of HIV and acquired immunodeficiency syndrome (AIDS) was assessed by 21 items. Adolescents and mothers evaluated each item as true or false. The KR20 coefficient for adolescents' responses to the 21 items was .70, and for mothers' responses it was .62.

#### *Statistical Analysis*

Intent to treat analyses were conducted using a mixed model, repeated measures analysis of variance. Because of a possible dependency among the participants from the same site (intraclass correlation) and because sites instead of individuals were randomized, a suitable model for a randomized cluster design was used (Murray, 1998).

Mothers were allowed to participate in the program with more than one age-eligible adolescent. Approximately 23% of the mothers participated with more than one child, creating a situation where adolescents were nested within mother. This intermediate level of nesting was not included in the model. A simulation study (Murray, Hannan, & Baker, 1996) found that the exclusion of such intermediate levels of nesting had no effect on the Type I error rate of the test.

The procedure MIXED in the statistical package SAS version 8 (SAS Institute, Cary, NC) was used to analyze the continuous outcomes, and the dichotomous outcome variables were analyzed using the generalized mixed model with a logit link function and binomial error distribution as operationalized by the SAS macro program GLIMMIX. The set of covariates in the final model consisted of age and gender for adolescent outcomes and gender of the adolescent for mother outcomes. Additional exploratory analyses were conducted to examine group differences on intention and communication variables collected at the 24-month follow-up. One-way analysis of variance was used to identify group differences and chi-square statistics were used to examine

group differences for categorical variables. An examination of adjusted standardized residuals was used to interpret the results of a statistically significant chi-square statistic (Argesti, 2002).

## RESULTS

A total of 582 adolescents and their mothers were enrolled in the trial (Figure 1). The total number of mothers who participated was 470; 110 mothers had more than one adolescent with whom they participated with in the study. At baseline, the adolescents ranged in age from 11 to 14 years ( $M = 12.2$ ,  $SD = 1.1$ ; Table 1). Adolescents were mostly male (60%) and African American (97.9%). Approximately 90% lived with their biological mother and 46.1% lived with their biological, step, or adoptive father. The mean age of the mothers was 37.9 years ( $SD = 6.80$ ; Table 1). Most mothers were African American (96.6%) and single (not married, divorced, widowed, or separated; 67.5%). Most mothers had attended at least some college (56.2%), and only 11.3% did not have a high school degree. Site differences ( $p < .001$ ) were evident for sex with some sites having a greater proportion of male participants. This difference was attributed to the fact that two sites offered programs for males only. A difference ( $p < .05$ ) in adolescent groups was noted in regard to age with the LSK group having a slightly older group of participants than the other two groups.

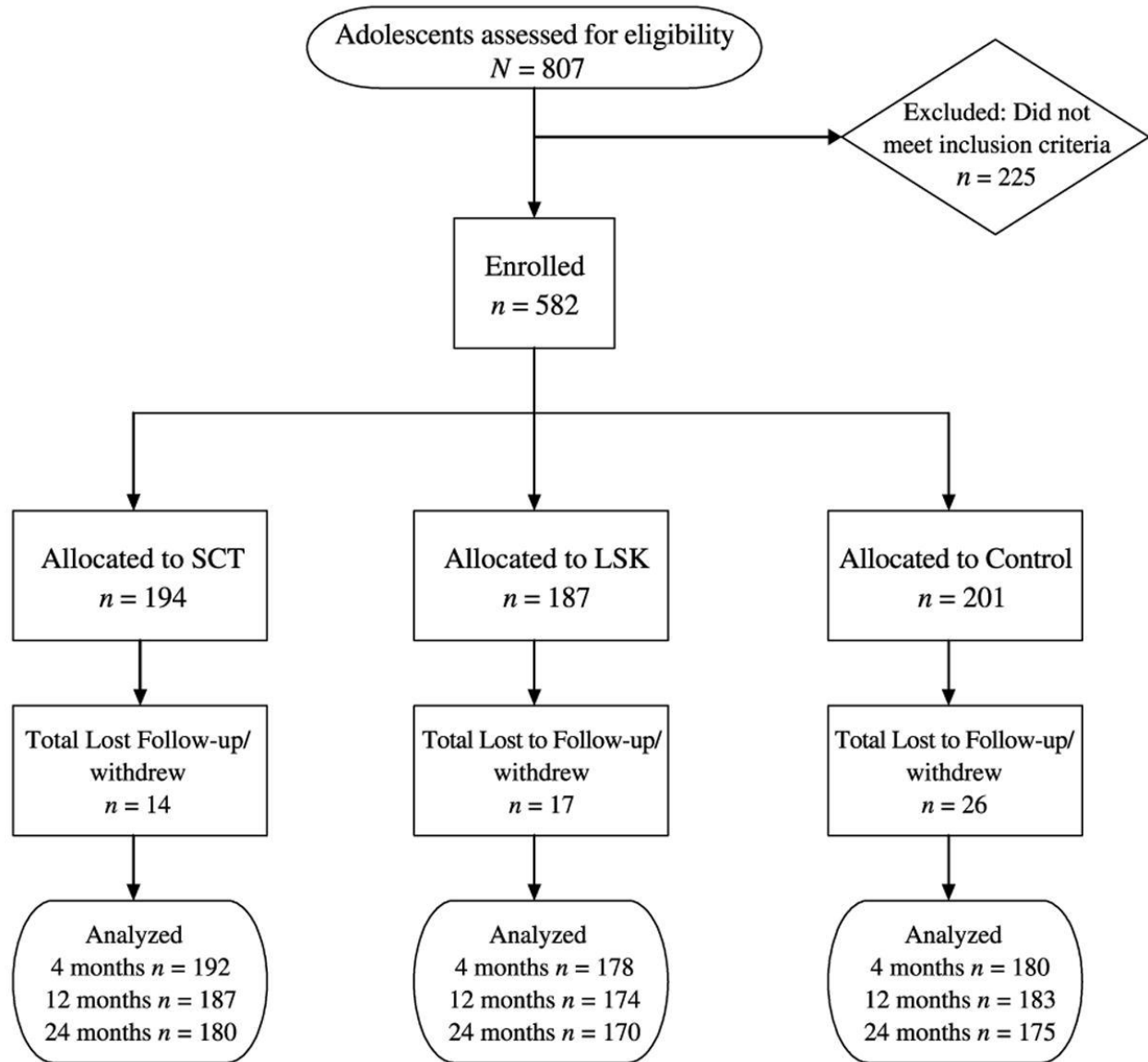


FIGURE 1. Flow diagram showing the retention of study participants.



		Time		
		4 Months	12 Months	24 Months
		Follow-up (2)	Follow-up (3)	Follow-up (4)
Baseline (1)				
<b>Adolescents by group</b>				
Sample size				
Control	201	180	183	175
LSK	187	178	174	170
SCT	194	191	187	180
Percent female				
Control	36.3	37.8	37.2	36.0
LSK	44.4	44.9	43.7	44.7
SCT	38.1	38.2	36.9	37.2
Mean age				
Control	12.1	12.4	13.1	14.0
LSK	12.4	12.8	13.5	14.5
SCT	12.2	12.5	13.3	14.2
Abstinence rate (%)				
Control	88	83	79	74
LSK	92	88	85	75
SCT	93	89	83	74
<b>Mothers by group</b>				
Sample size				

TABLE 1. Selected Adolescent and Mother Demographic Characteristics by Group and Time

*Adolescent Outcomes*

The results of the analyses for adolescent variables are reported in Table 2. Generally, the time effect was statistically significant, and the group and Group  $\times$  Time interaction effects were not statistically significant. For the two sexual behavior outcome variables—abstinence rate and intimate behaviors—there was a time effect with all groups showing a similar increase in the number of intimate behaviors and a decrease in the abstinence rate over time. Self-efficacy and outcome expectations for abstinence both increased over time with the increase for self-efficacy being slightly greater. HIV knowledge was assessed at baseline and at the 4-month follow-up. The Group  $\times$  Time interaction was statistically significant ( $p = .030$ ). While the SCT and control groups demonstrated an increase of 8 and 7 percentage points, respectively, the LSK group demonstrated an increase of three percentage points.

Adolescent Outcome Variables*	Group	Time	Group $\times$ Time	Group $\times$ Time $F(df_1, df_2)$ , Partial $\eta^2$ #
<b>Sexual behaviors</b>				
Abstinence rate	.766	<.001	.414	1.06(6,24), .01
Intimate behaviors	.907	<.001	.994	0.11(6,24), .001
<b>Condom use<sup>†</sup></b>				
Use in past 30 days	.034	.013	.022	4.26(6,10), .21
Use in past 3 months	.258	.052	.052	2.71(6,16), .14
Use in past 6–12 months	.101	.014	.016	4.60(4,13), .16
<b>Sexual possibility situations</b>				
Time alone with group	.837	.001	.419	1.05(6,24), .01
Time alone with one boy/girl <sup>‡</sup>	.134	.137	.706	0.80(6,24), .008
<b>Psychosocial</b>				
Outcome expectations for abstinence	.801	.030	.598	0.77(6,24), .007
Self-efficacy for abstinence	.508	<.001	.759	0.56(6,24), .005
<b>Communication about sex</b>				
Comfort talking to mother about sex	.571	.244	.825	0.47(6,24), .004
Communication with mother	.570	<.001	.991	0.13(6,24), .001
<b>HIV knowledge<sup>£</sup></b>	.153	<.001	.030	5.81(2,8), .019

\*Adjusted for adolescent gender and age.  
<sup>†</sup>For those indicating time spent alone with one boy/girl.  
<sup>‡</sup>For those indicating having had sex for those specific time periods.  
<sup>£</sup>As assessed at baseline and 4 month follow-up.  
<sup>#</sup>Estimated partial  $\eta^2$  without site effect included.

TABLE 2. Significance Levels of 3 (groups)  $\times$  4 (times) Repeated Measures Analysis of Variance F tests for Adolescent Outcomes

To stabilize the sample included in the analysis for condom use, only those respondents who indicated being sexually active three out of the four assessment periods were included in these analyses. For the 30-day and 6- to 12-month time periods, there was a significant Group  $\times$  Time interaction effect with participants in the LSK intervention group showing an increase in the condom use rate, whereas those in the SCT and control groups maintained a relatively high rate

of condom use throughout the four assessments. For the 3-month time period, the interaction effect approached significance with participants in the LSK group demonstrating an increase over time, and SCT and control participants maintaining a relatively high rate of condom use.

At the 24-month assessment, a higher percent of sexually active participants in the SCT and LSK groups reported that they had used a condom the last time they had sex, would use a condom every time they had sex, and indicated that they would end sexual activity until they were older (Table 3). Although the chi-square statistic associated with this latter variable was not statistically significant, the adjusted residuals indicated that members of the control group had a lower than expected chance of indicating they would delay sex until older.

Percent of Items	SCT <sup>†</sup>	LSK <sup>‡</sup>	Control	$\chi^2$ (2)
Used a condom the last time they had sex	96 (.6) <sup>§</sup>	100 (1.8)	85 (−2.5)	6.89*
Would use a condom every time they have sex	100 (1.2)	100 (.9)	94 (−2.2)	4.81
End sexual activity until they were older	43 (.2)	47 (1.2)	24 (−2.0)	4.28

\* $p < .05$ .

<sup>†</sup>Social cognitive theory group.

<sup>‡</sup>Life skills program group.

<sup>§</sup>Values in parentheses represent adjusted residual for the cell.

TABLE 3. Percent of Risk-Reduction Practices as Reported by Adolescent Participants at the 24-Month Assessment for Participants in the SCT, LSK, and Control Conditions

### *Mother Outcomes*

The results for mother variables of self-efficacy, outcome expectations, and comfort were similar to those observed for adolescent outcomes (Table 4). For HIV knowledge, assessed at baseline and at the 4-month follow-up, the Group  $\times$  Time interaction was statistically significant. The LSK and control groups demonstrated an increase of only 3% in HIV knowledge, whereas the SCT group demonstrated an increase of 6%.

Mother Outcome Variables*	Group	Time	Group × Time	Group × Time $F(df_1, df_2)$ , Partial $\eta^2$ <sup>†</sup>
Self-efficacy	.316	<.0001	.844	0.44 (6,24), .004
Outcome expectations	.775	.090	.320	1.24 (6,24), .012
General comfort talking about sex	.833	<.0001	.268	1.37(6,24), .013
Communication about sex	.327	<.0001	.343	1.19(6,24), .012
HIV knowledge	.292	<.0001	.010	8.75(2,8), .028

\*All mother outcomes adjusted for adolescent gender, except HIV knowledge.

<sup>†</sup>Estimated partial  $\eta^2$  without site effect included.

TABLE 4. Significance Levels of 3 (groups) × 4 (times) Repeated Measures Analysis of Variance Tests for Mother Participants

In addition to these analyses, maternal variables related to communication of sex-related topics at the 24-month assessment were examined. For specific sex-related items (e.g., what the mother thinks about teens having sex and when to have sex), three summary scores were computed for recent discussion, intent to discuss in the future, and comfort discussing the topic. The scores used for the analyses represent the percent of topics receiving a positive endorsement for each category of discussion (recent, intent, and comfort; Table 5). Group differences were found with respect to the percent of communication topics addressed. In general, mothers in the SCT group had talked about more of the topics during the preceding 3 months compared with the control

group, and mothers in the SCT and LSK groups indicated greater intent to discuss and more comfort discussing sexual topics than those in the control group. An examination of the adjusted residuals (Table 5) indicated that fewer than expected control mothers provided affirmative responses for 3-month discussion, intent, and comfort. The adjusted residuals for the SCT and LSK group were positive and, depending on the variable, greater than 2 for either the SCT or LSK group.

Percent of Items	SCT	LSK	Control	$F(df_{\text{num}}, df_{\text{den}})$
Discussed at all in past 3 months <sup>†</sup>	55 <sup>1</sup>	54	45 <sup>1</sup>	10.7 (2,523) <sup>***</sup>
Definitely will discuss in the future <sup>†</sup>	78 <sup>2</sup>	69 <sup>1</sup>	60 <sup>1,2</sup>	8.6 (2,524) <sup>***</sup>
High comfort talking about topic <sup>†</sup>	62 <sup>2</sup>	59 <sup>1</sup>	44 <sup>1,2</sup>	3.9 (2,524) <sup>*</sup>

Percent of mothers (average across items)	$\chi^2 (df)$			
Discussed at all in past 3 months	79 (.3)	85 (2.6)	71 (−2.9) <sup>‡</sup>	10.3 (2) <sup>**</sup>
Definitely will discuss in the future	78 (2.6)	71 (.2)	63 (−2.8)	9.8 (2) <sup>**</sup>
High comfort talking about topic	65 (2.4)	60 (1.1)	45 (−3.6)	13.4 (2) <sup>***</sup>

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

<sup>†</sup>Groups with a common numeric superscript are statistically different ( $p < .05$ ) based on Scheffe's test.

<sup>‡</sup>Values in parentheses represent adjusted residual for the cell.

TABLE 5. Percent of Sex-Related Communication Topics as Reported by Mother Participants at the 24-Month Assessment

## DISCUSSION

Keepin' it R.E.A.L.! was designed to test the efficacy of two interventions to promote the delay of sexual intercourse (abstinence) among adolescents and to enhance the mother's communication with her adolescent about sex. The findings show an increase in the number of adolescent participants who reported intimate behaviors and the initiation of sexual intercourse during the 2-year study period. Over time, the adolescent participants also reported increases in their confidence to say no to sex and more positive outcome expectations associated with not engaging in sexual intercourse. These changes were comparable across the treatment and control groups, suggesting that participants in the SCT and LSK intervention groups were no more likely to delay the initiation of sexual intercourse or to feel more confident and expect positive outcomes than those in the control group. However, adolescent participants who were sexually active and enrolled in the LSK group did show a greater increase in condom use over time than those in the SCT and control groups. The analyses of the condom use variables should be interpreted with some caution because the number of sexually active adolescents at any given time was somewhat small and variable (e.g., an adolescent may be included in the analysis for the 6-month time period, but not in the analysis of the 3-month or 30-day time periods).

The findings in this report indicate that for mother participants, both their level of self-efficacy and their comfort for talking with their adolescents about sex increased over time. A greater percentage of mother participants in the SCT and LSK groups discussed sex topics, reported an intention to discuss the topics in the future, and were more comfortable doing so. The adolescents' reported comfort in talking with their mothers about sex did not change over time, nor were there significant differences in the perception of comfort by adolescents in the program. At the 24-month assessment, a greater percentage of sexually active adolescent participants in the SCT and LSK groups compared with the control groups reported that they planned to end sexual activity until they were older.

Both mothers and adolescents demonstrated an increase in HIV prevention knowledge over time. Participants in the SCT groups exposed to HIV education demonstrated greater knowledge at the 4-month assessment than participants who did not receive this information. These findings are similar to other studies that demonstrate the value of prevention programs for parents and adolescents in enhancing knowledge about HIV risks and prevention behaviors (Miller et al., 1993).

The findings related to adolescent behaviors were modest. There are several possible reasons for the results. First, the rates of early initiation of sexual intercourse were lower than our estimates based on a previous study with a slightly older sample from the same population, compromising our ability to evaluate the influence of the program on sexual outcomes. Although some adolescents in all three groups initiated sexual intercourse during the 2-year study period, the percent of participants who had not initiated sexual intercourse was relatively high, ranging from 91% at the beginning of the study to 74% at the end of the study period. Our sample size calculations were based on a 58% abstinence rate among control group participants at the 24-month follow-up. Although significant differences were noted for condom use among



participants in the LSK group compared with participants in the other groups, the percent of condom use among those in both the SCT and control groups was very high (90-100%) at baseline, allowing little room to detect a change due to the program.

The effect of the two interventions in the Keepin' it R.E.A.L.! program may have been diluted by the nature of the assessment and the marketing of the program, both of which highlighted talking with teens about sex. Although mother participants in the control group received only an hour of HIV information, they did complete the baseline assessment that included many items related to talking about sex with their adolescent. In addition, as part of the consent process, they were told about the nature of the study that was to encourage communication between mother and adolescent. Comments from the mothers in the control group indicated that they believed that they were receiving information about how to talk to their adolescent about sex. For example, many believed that the assessment gave them information they could use to talk with their children. Thus, the baseline assessment and the knowledge about the intent of the program might have been sufficient to encourage mothers to talk with their children. In addition, mothers generally consider it their role to inform their children about puberty and sexual issues. The assessment and participation in the program may have raised their awareness of their role and the assessment may have provided ideas about the content of appropriate sex-based discussions.

Limitations of this study include the ceiling effect noted for several of the scales and the possibility of socially desirable responses to assessment items. In addition, the BGCMA provided lifeskill programs that, while voluntary, might have diluted the differences noted in the three groups.

Mothers who took the time to attend our program demonstrated an interest in the sexual health of their adolescents. It is possible that the mothers who attended the program would have discussed sexual issues with their children even without the program. Thus, mothers who elected not to attend the program might have been in greater need of skill development. Likewise, mothers and adolescents who do not participate in community-based programs that offer a variety of educational programs and skills training might have benefited more from this program. Future research could include selective recruitment of adolescents who are considered at high-risk for early initiation of sexual intercourse, including adolescents within the juvenile system.

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